East Waterway Operable Unit

Supplemental Remedial Investigation/ Feasibility Study

Anthropogenic Background Evaluation

----------Annotated Outline----------

1 Introduction

Provide a brief definition of the EW OU of the Harbor Island Superfund Site, the status of the CERCLA process for the EW OU, and the reason for the AB evaluation.

Brief summary of the collaborative process for developing AB, including meeting series with EPA, EWG, and Tribes.

1.1 Problem Definition

A draft problem definition was provided in AB meeting #1 (9/9/2020). Update as needed based on meeting series (e.g., dioxin/furan TEQ discussion will require updating).

1.2 Goals of the Evaluation

Draft goals were provided in AB meeting #1 (9/9/2020). Update as needed based on meeting series.

2 East Waterway Conceptual Site Model

2.1 Conceptual Site Model Overview

Overview of the EW location and setting, general hydrodynamic process, solids inputs (including estimated masses of solids inputs), grain sizes, sediment deposition and mixing, and site use/ structures, as relevant to the AB evaluation [generally follows CSM slides from meeting on 9/9/2020].

2.2 Green River Inputs

Description of the Green River watershed: size, land use for reaches of the watershed, tributaries.

Description of the hydrodynamics and sediment loading: Howard Hanson dam discharges, seasonal trends in discharges, the impacts of precipitation.

This section will be focused on Green River flows, sediment transport, and precipitation, and not on contaminant concentrations.

2.3 Urban Inputs

Description of the storm drain, CSO, and creek systems that discharge to the LDW and EW. Define "lateral" inputs. Discuss number and location, size, land use, discharge characteristics (e.g., frequency).

Discuss source control work (past, present, planned). Section will explain that the lateral dataset for EW and LDW drainage basins are not included in EW AB due to uncertainties in urban signatures following further source control actions within the basins. In addition, while urban inputs are contributing to AB, the mass contribution has been estimated to be small.

2.4 Lower Duwamish Waterway Bed Load

Brief description of the bed load from the LDW sediment transport model that resuspends and moves into EW. Will very briefly cite LDW Data Evaluation Report (2020) for current baseline average surface sediment concentrations in LDW, but explain that the dataset for LDW bed load is not considered further for EW AB due to expected cleanup activities of LDW (at another superfund site) and continued natural recovery over time.

3 Screening of Potentially Relevant Datasets

This section will discuss all the data that were considered in the AB evaluation and present a rationale for focusing on the Green River Suspended Solids dataset.

3.1 Green River Data

Summarize the studies, sampling methods, and media sampled for each study. Tabulate the number of samples by type: suspended solids, bedded sediment, and surface water.

3.2 Urban Input Data

Summarize the sampling programs and reference dataset summaries for the LDW and EW laterals. Explain that the lateral dataset is not being used for AB determination due to difficulty in estimating lateral inputs concentrations and loads as source control is not yet complete for all discharges. Acknowledge urban inputs are a consideration for AB, but there are challenges in using the available data.

3.3 Data Evaluation and Screening

Summarize the datasets based on the framework presented in AB Meeting # 5 on 10/21/20. Repackage Table 1 (East Waterway Anthropogenic Background Estimation: Green River Suspended Solids and Whole Water Data Sufficiency) from that meeting.

Summarize the retained data (Green River suspended solids) and explain why suspended solids data was selected, in collaboration with the EPA, over other data for AB.

4 Green River Suspended Solids Data Evaluations and Refinement

Describe the purpose of the evaluation: to select a refined suspended solids dataset that: 1) is generally representative of upstream material settling in the EW, 2) minimizes assumptions needed to calculate an AB value, and 3) is relatively robust to identified uncertainties. Evaluations performed to facilitate refinement of the Green River suspended solids data for estimation of AB included the following:

4.1 Sampling Methods

- Centrifuge, filter solids and sediment traps
- Conclusion/selection of retained sample methods

4.2 Total PCBs

- Analytical methods
- Summing methods
- Total PCB Aroclors
- Conclusion

4.3 Dioxin/Furan Congener Selection

- Analytical methods
- Contribution to risk and RBTCs
- Conclusion

4.4 Arsenic

- Analytical methods
- Conclusion

4.5 Outlier Evaluation

- QQ plots
- Conclusion

4.6 Particle Size Distribution in Suspended Sediment

- Fines-normalization
- Fines-screening

- Surface-area method
- Conclusion

4.7 River Flow and Precipitation Weighting

- River flow and precipitation binning
- Conclusion

4.8 Summary of AB Data Selection and Data Treatments

The refined AB dataset consists of the following:

- PCB summing based on ND = 0
- PCB Congeners only
- Subset of D/F Congeners
- Centrifuge and filter solid samples only
- Fines-normalization (pending further discussion with EPA)

5 Anthropogenic Background Calculation

Summary Statistics: n, mean, median, 90/90 UTL and UCL95

6 Uncertainty and Sensitivity Analysis

Summarize and discuss the evaluations from Sections 4.1 through 4.7, as presented in the sensitivity bar charts shown at the January large group meeting. Will also mention that arsenic is likely biased high due to uncertainty of biogeochemical processes, uncertainty in particle settling, and EW, LDW, and other available bedded sediment data as lines of evidence, and dioxin/furan and PCBs are biased low due to uncertainty normalizing to fines.